PRODUKSI SENYAWA BIOPLASTIK P(3HB) DARI MINYAK KELAPA SAWIT DALAM BIOREAKTOR KAPASITAS 100 LITER DAN PEMANFAATANNYA SEBAGAI KEMASAN RAMAH LINGKUNGAN

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ABSTRACT

This research was initiated to study the ability of *Erwinia* sp. USMI-20 to produce a bioplastic compound of P(3HB) from palm oil as a single carbon sources by fermentation process. Fermentation was cunducted in a 100L bioreactor at pH 7, aeration 40 % v/v, agitation 200 rpm far 48 hours. The polymer granules accumulated in the cells of *Erwinia* sp. USMI-20 upon cultivation were extracted and purified and characterized by using gas chromatography (GC), 1H and 13C nuclear magnetic resonance (NMR). The thermal properties including melting temperature *(T* m) and glass transition temperature *(T* g) for the polymer were analyzed by differential scanning calorimetry (DSC). The molecular weight was determined by gel permeation chromatography (GPC). Our results showed that by using palm oil as the sole carbon source, *Erwinia* sp. USMI-20 was able to produce P(3HB) with a maximum polymer content of 45. 8 % of the dry cell weight with an optimum fermentation time of 48 hours. The *T* m and *T* 9 of polymer were of 175 °c and 15 °c respectively. The weight-average molecular weight (Mw) of the P(3HB) produced was 700.000-800.000 Da whereas the number-average (MJ was 250.000-300.000 Da with a polydispersity index *(Mw/MJ* of 2.3-2.8.